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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/697,542	10/26/2000	Kunisaburo Tomono	P/1071-1154	5711

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EXAMINER

BERNATZ, KEVIN M

ART UNIT	PAPER NUMBER
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1773

DATE MAILED: 04/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/697,542

Applicant(s)

TOMONO ET AL.

Examiner

Kevin M Bernatz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 3-14 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Amendments to claims 1 – 4, 6, 15 and 16, filed on December 4, 2002, have been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Examiner's Comments

3. Applicant's invention appears to be directed to a spinel ferrite comprising at least three or four distinct oxides within specific compositional ranges overlapped by the prior art (see prior art cited below). Should applicants wish to show unexpected results for a concentration range within a prior art disclosed ranges, applicants are reminded that the showing of unexpected results must be commensurate in scope with the claimed limitations. Furthermore, applicant(s) are reminded that **a detailed description of the reasons and evidence** supporting a position of unexpected results must be provided **by applicant(s)**. A mere pointing to data requiring the examiner to ferret out evidence of unexpected results **is not sufficient** to prove that the results would be truly unexpected to one of ordinary skill in the art. *In re D'Ancicco*, 439 F.2d 1244, 1248, 169 USPQ 303, 306 (1971) and *In re Merck & Co*, 800 F.2d 1091, 1099, 231 USPQ 375, 381 (Fed. Cir. 1986).

Claim Objections

4. Claim 4 is objected to because of the following informalities: the compositional requirements for “y” appear to have a typographical error, i.e. “0.5 – 0.1” should be “0.05 – 0.1” based on claim 3 and applicants’ disclosure. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. Claims 3 – 5, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe et al. ('620).

Regarding claims 3 and 4, Watanabe et al. disclose a composite magnetic material comprising a ferrite powder and a resin (*col. 10, lines 55 – 59*) wherein said ferrite powder comprise a Ni and Co containing spinel ferrite with overlapping concentration ranges (*col. 3, lines 15 – 16 and col. 10, lines 40 – 43*). Specifically, Watanabe et al. disclose the following atomic percents for x, y and z (see also Table 1 below):

- x of 0.45 – 0.55 (*col. 3, lines 23 – 24 – “In nickel based ferrites, the content of Ni preferably ranges from about 45 to about 55 mol% calculated as NiO”*);
- y of 0 - 5 wt% (~ 0 - 7.5 atomic percent) (*col. 3, lines 26 – 28 and notes by col. 10 – i.e. if 5 wt% of CoO is added to the example in col. 10 (instead of the disclosed 0.4 wt%), the atomic percent would equal ~7.5%*);
- z of 0 – 0.40 (*col. 3, lines 25 – 26 – “Part of the nickel may be replaced by up to 40 mol% of Cu, Zn or Li or a mixture thereof”*); and

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- 1-x-y-z of 0.45 – 0.55 (col. 3, lines 23 – 26, as cited above where “nickel based ferrites” is $(\text{NiO})(\text{Fe}_2\text{O}_3)$, which has 45-55 mol% NiO and, therefore, 55-45 mol% Fe_2O_3 and Watanabe et al. teach “[p]art of the nickel may be replaced ...”, meaning the Fe_2O_3 content stays in the range of 45 – 55 mol%; see also col. 8, lines 3 – 5 and Examples teaching amounts of Fe_2O_3 within the above range).

Table 1: Comparison of disclosed and claimed atomic percents

	$(\text{NiO})_x$	$(\text{CoO})_y$	$(\text{MeO})_z$	$(\text{Fe}_2\text{O}_3)_{1-x-y-z}$
Claim 3	$0.1 \leq x \leq 0.55$	$0.05 \leq y \leq 0.20$	$0 \leq z \leq 0.20$	$0.4 \leq 1-x-y-z \leq 0.6$
Claim 4	$0.205 \leq x \leq 0.48$	$0.05 \leq y \leq 0.10$	$0 \leq z \leq 0.20$	$0.45 \leq 1-x-y-z \leq 0.55$
Watanabe et al.	$0.45 \leq x \leq 0.55$	$0 \leq y \leq 0.075$	$0 \leq z \leq 0.40$	$0.45 \leq 1-x-y-z \leq 0.55$
Overlap	$0.45 \leq x \leq 0.48$	$0.05 \leq y \leq 0.075$	$0 \leq z \leq 0.2$	$0.45 \leq 1-x-y-z \leq 0.55$

Regarding claim 5, Watanabe et al. disclose embodiments wherein $z = 0$ (Table 1 above and example 3).

Regarding claims 7 and 8, Watanabe et al. disclose adding Cu and/or Zn (col. 4, lines 23 - 29).

Claim Rejections - 35 USC § 103

6. Claims 3 – 5, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. as applied above.

Watanabe et al. is relied upon as described above.

Regarding claims 3 and 4, in the event that one of ordinary skill would not readily envisage a composition meeting applicants' claimed limitations from the overlapping ranges disclosed by Watanabe et al., it would have still been obvious to one of ordinary skill in the art at the time of applicants' invention to have selected any values out of the Watanabe et al. disclosed ranges in order to optimize the magnetic properties, mechanical properties and corrosion resistance of the ferrite product.

It would therefor have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the composition atomic percentages through routine experimentation in the absence of a showing of criticality in the claimed composition atomic percentages, given the teaching in Watanabe et al. with regard to preferred ranges to use for the various components. *In re Boesch*, 205 USPQ 215 (CCPA 1980), *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claim 5, 7 and 8, Watanabe et al. disclose the claimed invention as cited above.

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7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. as applied above, and further in view of JP 10-335131-A. See provided Machine Translation and Derwent Abstract of JP '131 A.

Watanabe et al. is relied upon as described above.

Watanabe et al. fail to teach adding MgO in an amount greater than 0 atomic percent.

However, JP '131 A teach that Mg and Zn are known equivalents for spinel ferrites (*Paragraph 0002 wherein NiCuZn systems are directly compared to equivalent NiCuMg systems, i.e. the only difference is Zn instead of Mg*). Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, MgO and ZnO are equivalents in the field of oxides added to spinel ferrite magnetic materials. *In re Fount* 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *Graver Tank & Mfg. Co. Inc. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Watanabe et al. to include MgO instead of ZnO as taught by JP '131 A since MgO and ZnO are known equivalents for oxides added to spinel ferrite magnetic materials and substitution of known equivalents is within the knowledge of one of ordinary skill in the art.

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8. Claims 3 – 5, 7 – 10 and 12 - 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '711 A in view of Uchikoba ('296).

Regarding claims 3 and 4, JP '711 A disclose a composite magnetic material comprising a ferrite powder and a resin (*Derwent Abstract and Paragraph 0016*) wherein said ferrite powder comprise NiO, Fe₂O₃ and MeO atomic percents overlapping applicants' claimed ranges (see Table 3 below):

- x of 0.026 – 0.464 (*Abstract value for "a(1-x)"*),
- z of 0.013 – 0.762 (*Abstract values for "ax" and "b"*), and
- 1-x-y-z of 0.32 – 0.485 (*Abstract values for "c"*).

Table 3: Comparison of disclosed and claimed atomic percents

	(NiO) _x	(CoO) _y	(MeO) _z	(Fe ₂ O ₃) _{1-x-y-z}
Claim 3	0.1≤x≤0.55	0.05≤y≤0.20	0≤z≤0.20	0.4≤ _{1-x-y-z} ≤0.6
Claim 4	0.205≤x≤0.48	0.05≤y≤0.10	0≤z≤0.20	0.45≤ _{1-x-y-z} ≤0.55
JP '711 A	0.026≤x≤0.464	0≤y≤0.035	0.013≤z≤0.762	0.32≤ _{1-x-y-z} ≤0.485
Overlap	0.1≤x≤0.464	none	0.013≤z≤0.20	0.45≤_{1-x-y-z}≤0.485

JP '711 A fail to disclose a CoO concentration meeting applicants' claimed limitations, teaching that CoO is expensive and that the reason to keep the concentration down below 3.5 mol% is to minimize cost (*Paragraph 0010*).

However, Uchikoba teaches that the amount of Co relative to Fe in ferrite composites can be as high as 1/6 the atomic percent (*col. 3, lines 22 – 34 and claim 1 –*

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wherein " $Ba_3Co_2Fe_{24}O_{41}$ " means $(BaO)_3(CoO)_2(Fe_2O_3)_{12}$, which is a 6:1 ratio of Fe_2O_3 to CoO). $1/6^{th}$ of the JP '711 A Fe_2O_3 composition equals a maximum CoO amount of 8.1% ($y = 0.081$). The exact amount of CoO added is a cause effective variable based on the desired magnetic permeability, resistivity, bending strength (*Uchikoba*; Table 1) and Q value (JP '711 A – Paragraph 0010).

It would, therefore, have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the amount of CoO through routine experimentation, especially given the teachings of JP '711 A in acceptable ranges for CoO concentration and the impact on CoO concentration on the magnetic properties of the inductor element. *In re Boesch*, 205 USPQ 215 (CCPA 1980), *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claim 5, '711 A disclose $Me = Zn$, where the atomic percent of Zn can equal 0, thereby meeting applicants' claimed limitations (*Abstract values for "b"*).

Regarding claims 7 and 8, '711 A disclose adding Cu and/or Zn (*Abstract*).

Regarding claims 9, 10 and 12 - 16, '711 A disclose an inductor element meeting applicants' claimed limitations (*Derwent Abstract*).

9. Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '711 A in view of *Uchikoba* as applied above, and further in view of JP '131-A. See provided Machine Translation and Derwent Abstract of JP '131 A.

JP '711 A in view of *Uchikoba* is relied upon as described above.

Neither of the above teach adding MgO in an amount greater than 0 atomic percent.

However, JP '131 A teach that Mg and Zn are known equivalents for spinel ferrites (*Paragraph 0002 wherein NiCuZn systems are directly compared to equivalent NiCuMg systems, i.e. the only difference is Zn instead of Mg*). Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, MgO and ZnO are equivalents in the field of oxides added to spinel ferrite magnetic materials.

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of JP '711 A in view of Uchikoba to include MgO instead of ZnO as taught by JP '131 A since MgO and ZnO are known equivalents for oxides added to spinel ferrite magnetic materials and substitution of known equivalents is within the knowledge of one of ordinary skill in the art.

Response to Arguments

10. The rejection of claims 1 - 16 under 35 U.S.C § 102 – Watanabe et al.

Applicants' argue that since a 103 rejection was applied in addition to the 102 rejection, Watanabe et al. clearly is not a 102 reference. The Examiner respectfully disagrees.

Applicants are reminded that a reference is good not only for what it teaches by direct anticipation but also for what one of ordinary skill might reasonably infer from the teachings. *In re Opprecht* 12 USPQ 2d 1235, 1236 (Fed. Cir. 1989); *In re Bode* 193

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USPQ 12 (CCPA 1976); *In re Lamberti* 192 USPQ 278 (CCPA 1976); *In re Bozek* 163 USPQ 545, 549 (CCPA 1969); *In re Preda* 159 USPQ 342 (CCPA 1968); *In re Van Mater* 144 USPQ 421 (CCPA 1965); *In re Jacoby* 135 USPQ 317 (CCPA 1962); *In re LeGrice* 133 USPQ 365 (CCPA 1962). In the instant case, Watanabe et al. teaches concentration ranges overlapping applicants' claimed ranges, which constitutes a *prima facie* case of anticipation. As stated in the 103 rejection of record, where one of ordinary skill in the art may not have envisioned the exact concentration "sub-range" claimed by applicants, it would have still be obvious to optimize within the overall range disclosed by Watanabe et al. since Watanabe et al. disclose the broad range encompassing applicants' claimed narrower range.

Applicants further argue that Watanabe et al. teach away from the claimed invention because Watanabe et al. "teaches driving off the binder resin by firing". The Examiner respectfully disagrees.

The Examiner notes that present claims 3 – 8 are directed merely to a "composite magnetic material, comprising a ferrite powder and a resin". Watanabe et al. clearly teach such a material as a stable form ("*The resulting powder alone ... was dispersed in terpineol along with a predetermined amount of ethyl cellulose, and mixed in a Henschel mixer to obtain a paste ... The paste was applied on a polyethylene terephthalate substrate by a printing technique. The laminate was separated from the substrate and fired..." col. 8, lines 16 – 26) [emphasis added]. Therefore, at least prior to firing, Watanabe et al. clearly teach a paste comprising a "composite magnetic*

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material, comprising a ferrite powder and a resin", thereby meeting applicants claimed limitations.

11. The rejection of claims 4, 5, 12 and 13 under 35 U.S.C § 103 – JP '711 A in view of Uchikoba

Applicant(s) argue(s) that Uchikoba fails to teach the relied upon subject matter. The examiner respectfully disagrees.

Uchikoba teaches a (BaCoFe)O material with or without additional Ni or Zn additives. The maximum amount of Co ions added to these compounds is disclosed to be 1/12th the amount of Fe ions (i.e. "Co₂Fe₂₄"). Since Co is disclosed to exist as CoO and Fe is disclosed to exist as Fe₂O₃ (*col. 3, lines 35 – 37 and col. 7, lines 53 - 57*) and the fact that Ba₃Co₂Fe₂₄O₄₁ = (BaO)₃(CoO)₂(Fe₂O₃)₁₂ from col. 3, line 32, provides a clear teaching that the maximum amount of CoO taught by Uchikoba is 1/6 the amount of Fe₂O₃.

Applicants further argue that JP '711 A teaches away from the claimed invention because JP '711 A teaches eliminating the resin component. The Examiner respectfully disagrees.

The Examiner notes that Machine Translation Paragraph 0016 clearly teaches injection molding the ferrite inductor with an epoxy resin, thereby meeting the claimed limitation of a "composite magnetic material, comprising a ferrite powder and a resin".

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Several references teach that inductors formed from spinel ferrites bonded with resin are old in the art (U.S. Patent No's: 4,268,430; 4,485,162; 6,028,353; 6,033,594; and 6,338,900). These references disclose similar spinel ferrite compositions as applicants, though without identical concentration ranges (see *underlined/boxed sections*). JP 06-140229 A teach spinel ferrite plus resin inductors comprising overlapping Fe_2O_3 , NiO, CuO and ZnO concentrations, as well as explicitly teaching that CoO and MgO can be added to these materials, though no concentration ranges for CoO or MgO are disclosed (*Figure 9; JPO Abstract and Paragraphs 0011, 0041 – 0043 and 0060 of Machine Translation*). Makino et al. (U.S. Patent No. 4,282,302) teach a spinel ferrite in a binder with overlapping concentration ranges for NiO, CoO, MgO and Fe_2O_3 (*col. 3, lines 30 – 38; col. 5, lines 14 – 68; col. 6, line 6 – 11; and examples*). Hashimoto et al. (U.S. Patent No. 5,698,336) teach a spinel ferrite in a binder with overlapping concentration ranges NiO, CoO, CuO and Fe_2O_3 (*Table 1; col. 2, lines 42 – 50; col. 4, lines 21 – 24; col. 8, lines 24 – 34; and col. 9, lines 26 - 32*).
13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Applicants' amendment resulted in embodiments not previously considered (i.e. a CoO range of 0.05 – 0.20) which necessitated the new grounds of rejection, and hence the finality of this action.

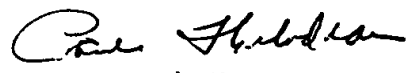
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (703) 308-1737. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.



KMB
April 9, 2003



Paul Thibodeau
Supervisory Patent Examiner
Technology Center 1700